BioMed Research International 2018 vol.2018

Rectal Cancer: Redox State of Venous Blood and Tissues of Blood Vessels from Electron Paramagnetic Resonance and Its Correlation with the Five-Year Survival

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Abstract

© 2018 A. P. Burlaka et al. A role of pro- and antioxidants for reducing rectal cancer (RC) incidence in operative, preoperative, and postoperative treatments is still disputable and controversial. The redox state of venous blood and tissues of blood vessels of 60 patients with RC (T2-4N0-2M0G2) and 20 donors is studied by means of the conventional and spin-trapping electron paramagnetic resonance (EPR). The intensity of the signals from ceruloplasmin (CP), transferrin (TF), and labile iron pool (LIP) at temperature T = 77 K as well as superoxide generation rate and nitric oxide (NO) levels at T = 300 K is measured. The reduced CP and TF activity and decreased NO levels increased LIP levels and superoxide-generating rates are detected in blood species. Correlation analysis for the five-year survival rate as a function of the extracted values is done. The results show that the intensities of the corresponding EPR signals from the "native" and "trapped" paramagnetic centers can be potentially used for the understanding of the molecular mechanisms underlying the RC progression and treatment.

http://dx.doi.org/10.1155/2018/4848652

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